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Paper 295
Entered: 12 February 2015

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT TRIAL AND APPEAL BOARD

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JODI A. **DALVEY** and NABIL F. NASSER, *Junior Party*,
v.
ULF **BAMBERG**, PETER KUMMER and ILONA STIBUREK, *Senior Party*.

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*Interference 105,961 McK*
Daley Patent 7,754,042 B2
v.
Bamberg Application 13/182,197

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*Interference 105,964 McK*
Dalvey Patent 7,749,581 B2, Patent 7,766,475 B2
Patent 8,361,574 B2, and Patent 8,703,256 B2
v.
Bamberg Application 13/177,284

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*Patent Interference 105,966 McK*
Dalvey Patent 7,771,554 B2 and RE 41,623 E
v.
Bamberg Application 13/207,236 and Application 13/223,541

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Before: FRED E. McKELVEY, RICHARD E. SCHAFER, and
JAMES T. MOORE, *Administrative Patent Judges*.

McKELVEY, *Administrative Patent Judge*.

**JUDGMENT**

In view of the DECISION ON MOTIONS (Paper 294), it is—

ORDERED that judgment be entered against senior party Ulf Bamberg, Peter Kummer, and Ilona Stiburek and real party in interest Arkwright Advanced Coating, Inc, as to all counts;

FURTHER ORDERED that claims 23-34 (all claims) of Bamberg involved application 13/182,197 be FINALLY REFUSED, 35 U.S.C. 135(a);

FURTHER ORDERED that claims 30-49 (all claims) of Bamberg involved application 13/177284 be FINALLY REFUSED, 35 U.S.C. 135(a);

FURTHER ORDERED that claims 1-17 (all claims) of Bamberg involved application 13/233,541 be FINALLY REFUSED, 35 U.S.C. 135(a);

FURTHER ORDERED that claims 1-2 and 5-14 (all claims) of Bamberg involved application 13/207,236 be FINALLY REFUSED, 35 U.S.C. 135(a);

FURTHER ORDERED that a copy of this judgment be entered in the administrative record of:

(1) Patent 7,754,042;

(2) Patent 7,749,518;

(3) Patent 8,361,574;

(4) Dalvey Application 13/745,995;

(5) Reissue Patent 41,623;

(6) Patent 7,771,554;

(7) Bamberg Application 13/182,197;

(8) Bamberg Application 13/177,284;

(9) Bamberg Application 13/233,541; and

(10) Bamberg Application 13/207,236.

FURTHER ORDERED that a party seeking judicial review timely serve notice on the Director of the United States Patent and Trademark Office. 37 C.F.R. §§ 90.1 and 104.2.

FURTHER ORDERED that attention is directed to *Biogen Idec MA, Inc., v. Japanese Foundation for Cancer Research*, 2014 WL 2167677 (D. Mass. 2014).

NOTICE: "Any agreement or understanding between parties to an interference, including any collateral agreements referred to therein, made in connection with or in contemplation of the termination of the interference, shall be in writing and a true copy thereof filed in the Patent and Trademark Office before the termination of the interference as between the said parties to the agreement or understanding." 35 U.S.C. 135(c); see also Bd.R. 205 (settlement agreements).

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Dalvey Patent 7,749,581 B2, Patent 7,766,475 B2
Patent 8,361,574 B2, and Patent 8,703,256 B2
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*Patent Interference 105,966 McK*
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Before: FRED E. McKELVEY, RICHARD E. SCHAFER, and
JAMES T. MOORE, *Administrative Patent Judges*.

McKELVEY, *Administrative Patent Judge*.

**DECISION ON MOTIONS**

## I. Introduction

Three interferences were declared:

(1) Interference 105,961,

(2) Interference 105,964, and

(3) Interference 105,966.

The interferences were consolidated. *See*, *e.g.*, Paper 139.

Since February of 2014, all papers have been filed in the administrative record of Interference 105,964.

References to Paper Numbers in this opinion are to a paper in the record of Interference 105,964 unless otherwise noted.

The reader is referred to a Fourth Redeclaration (Paper 178) for an identification of (1) the parties, (2) the patents, reissue patent, and applications involved in each interference, (3) the counts, and (4) earlier constructive reductions to practice (i.e., benefit for the purpose of priority) accorded to the parties.

A copy of Paper 178 appears as Appendix 1 to this opinion.

The parties are involved in a civil action for infringement filed in the U.S. District Court for the District of Minnesota styled as *Schwendimann v. Arkwright Advanced Coating, Inc.*, Civil Action No. 0:11-cv-00820-ADM-JSM. Paper 14, page 2:5-6.

Counsel have advised the Board that the civil action has been stayed pending outcome of this interference.

## II. Counts

A count defines the interfering subject matter and limits the scope of proofs on the issue of priority.

The counts are Count 1, Count 2, and Count 3.

Count 1 is involved in Interference 105,964. Paper 178, page 8.

Count 2 is involved in Interference 105,961. Paper 178, page 4.

Count 3 is involved in Interference 105,966. Paper 178, pages 12-13.

## III. Oral argument

Oral argument took place on 24 November 2014.

A copy of a transcript of oral argument has been made of record. Paper 293.

## IV. Motions

We decide Dalvey Motions 3 and 8 and Bamberg Motions 5 and 7.

### A. Dalvey Motions

#### 1. Dalvey Motion 3

Dalvey Motion 3 seeks entry of judgment based on an alleged lack of a written description and enablement. Paper 110.

Dalvey Supplement to Motion 3 seeks entry of judgment as to all involved Bamberg claims in Bamberg application 13/207,236, added to the interference after Dalvey Motion 3 was filed. Paper190.

Bamberg opposes. Paper 225.

Dalvey has replied. Paper 252.

#### 2. Dalvey Motion 8

Dalvey Motion 8 seeks exclusion of evidence. Paper 113.

Bamberg opposes. Paper 227.

Dalvey has replied. Paper 262.

3. Other Dalvey Motions

In view of our disposition of Dalvey Motion 3 and Dalvey Motion 8, we have not considered or decided the following Dalvey motions:

(1) Dalvey Motion 2 (Paper 86) (for judgment based on § 135(b));

(2) Dalvey Motion 4 (Paper 178) (to substitute counts); and

(3) Dalvey Motion 5 (Paper 113) (judgment based on priority).

B. Bamberg Motions

1. Bamberg Motion 5

In response to Dalvey Motion 3 (37 C.F.R. §41.121(a)(2)), Bamberg Motion 5 seeks entry of an order authorizing filing a motion to amend to substitute new claims. Paper 80.

Dalvey has opposed. Paper 217.

Bamberg has replied. Paper 258.

2. Bamberg Motion 7

Bamberg Motion 7 sees to exclude evidence. Paper 270.

Dalvey has opposed. Paper 274.

Bamberg has replied. Paper 279.

3. Other Bamberg Motions

In view of our disposition of Dalvey Motion 3, we have not considered or decided the following Bamberg motions:

(1) Bamberg Motion 1 (Paper 80) (substitute new counts);

(2) Bamberg Motion 2 (Paper 117 (vacate accorded benefit);

(3) Bamberg Motion 3 (Papers 118 and 190) (contingent on priority be awarded to Dalvey, judgment against Dalvey based on unpatentability over the prior art); and

(4) Bamberg Motion 6 (Paper 131) (judgment based on priority).

## V. Dalvey Motion 3

### A. Introduction

The Board may take up motions in any order. 37 C.F.R. § 125(a).

We elect to take up Dalvey Motion 3 first because it raises a "threshold" issue. If the motion is granted, Dalvey prevails. 37 C.F.R. § 411.201 (definition of "Threshold issue" (2)(ii)); 37 C.F.R. § 41.208(a)(1).

Dalvey Motion 3 seeks entry of judgment as to all involved Bamberg claims based on an alleged lack of a written description and enablement. Paper 110; Paper 190.

### B. Facts[1]

#### 1. Terminology

1. "Bamberg" is a reference to the party Bamberg, the real party in interest being Arkwright Advanced Coating, Inc. Paper 25.
2. "Ulf Bamberg" or "Mr. Bamberg" is a reference to inventor Bamberg.
3. "Dalvey" is a reference to the party Dalvey, the real party in interest being Jodi A. Schwendimann. Paper 17. NuCoat, Inc., and Cooler Concepts, Inc., are licensees. *Id*.
4. "Jodi A. Dalvey" and "Jodi A. Schwendimann" refer to the same person—an inventor named in the involved Dalvey patents.

[1] To the extent that a finding is a conclusion of law, it may be treated as such.

2. Issue

5. The general issue is whether Bamberg's claims are unpatentable under 35 U.S.C. § 112, first paragraph, due to a lack of an adequate written description.

6. According to Dalvey, Bamberg copied claims in its application for the purpose of provoking interferences with Dalvey patents.

7. Dalvey therefore reasons that the copied Bamberg claims must be construed in light of the Dalvey patents, the patents from which the claims were copied. Paper 110, page 5; *Agilent Technologies, Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1375 (Fed. Cir. 2009).

8. Bamberg, while not explicitly denying that it copied claims, maintains that the words in the claims should be given their ordinary and customary meanings. Paper 225, page 2; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc).

9. As will become apparent, in this case whether *Agilent* or *Phillips* is applied makes no difference.

10. The specific issue is the parties ask us to decide is: Does the descriptive portion of the specification of Bamberg's PCT application have a written description for claims that cover "white layers" that melt at a temperature *below* about 220º C.?

3. Burden and Standard of Proof

11. Dalvey has the burden of proof. 37 C.F.R. § 41.121(b).

12. The standard of proof is a preponderance of the evidence. *See*, *e.g.*, *Bilstad v. Wakalopulos*, 386 F.3d 1116, 1120-21 (Fed. Cir. 2004) (in

connection with a motion for judgment based on a lack of written description, movant has a burden by a preponderance of the evidence).

13. Whether claimed subject matter is supported by a written description is a question of fact. *In re Alton*, 76 F.3d 1168, 1171 (Fed. Cir. 1996).

## 4. Witnesses

### (a) Dr. Scott A. Williams

14. Dr. Scott A. Williams was called as a witness for Dalvey. **Ex. 2016** (direct testimony); **Ex. 2045** (cross-examination).

15. He was awarded a Bachelor of Science degree from Purdue University (1984) and a Ph.D. in physical chemistry from Montana State University (1989). **Ex. 2016**, Appendix A (Board Assigned Page #548).

16. Dr. Williams is a Professor at the School of Chemistry and Materials Science of the Rochester Institute of Technology. **Ex. 2016**, ¶ 1.

17. He has also served as a Professor of Imaging Materials and Processes. **Ex. 2016**, ¶ 2.

18. Dr. Williams has taught courses in polymer chemistry. **Ex. 2016**, ¶ 3.

19. He was Director of Research & Development at Fotowear, a company that Dr. Williams testified was focused on iron-on-image transfer products. **Ex. 2016**, ¶ 7.

20. Dr. Williams is qualified to express opinions on technical matters related to the subject matter involved in this interference.

(b) Dr. William M. Risen, Jr.

21. Dr. William M. Risen, Jr., was called as a witness on behalf of Bamberg. **Ex. 1531** (direct testimony); **Ex. 2051** (cross-examination).

22. He was awarded a Bachelor of Science degree in Chemistry from Georgetown University (1962) and a Ph.D. from Purdue University (1967). **Ex. 1531**, Appendix A (Board page #2,653).

23. Dr. Risen is a Professor Emeritus of Chemistry at Brown University. **Ex. 1531**, ¶2.

24. He has worked with polymers and associated technology. **Ex. 1053**, ¶ 8

25. Dr. Risen has consulted "in the area of media . . . for more than 20 years, including specifically in the area of color print media and image transfer." *Id*.

26. He is named as an inventor on six patents relating to print media. *Id*.

27. Dr. Risen is qualified to express opinions on technical matters related to the subject matter involved in this interference.

(c) Ulf Bamberg

28. Mr. Ulf Bamberg was called as a fact witness by Dalvey. **Ex. 2030** (direct testimony); **Ex. 2047** (cross-examination).

29. He is a named inventor on the involved Bamberg applications. **Ex. 2030**, ¶ 1.

30. Mr. Bamberg was paid by Dalvey at the rate of $100.00 per hour.

31. His testimony relates to development activities associated with making the inventions described and claimed in the involved Bamberg applications. **Ex. 2030**, ¶¶ 3-10.

5. Claims Involved in the Interferences

32. The claims of the parties involved in the interferences are set out in the following Table 1.

**Table 1**

| Interference | Corresponding Dalvey Claims | Corresponding Bamberg Claims |
|---|---|---|
| 105,961 | Patent 7,754,042, claims 1-22 | Appl'n 13/182,197, claims 23-34 |
| 105,964 | Patent 7,749,581, claims 1-31<br>Patent 7,766,475, claims 1-21<br>Patent 8,361,574, claims 1-20<br>Appl'n 13/745,995, claims 1-20 | Appl'n 13/177,284, claims 30-49 |
| 105,966 | Reissue 41,623, claims 1-17<br>Patent 7,771,554, claims 1-14 | Appl'n 13/233,541, claims 1-17<br>Appl'n 13/207,236, claims 1-2 and 5-14 |

Paper 110 (Dalvey Motion 3, page 3); Paper 190 (Dalvey Supplement to Motion 3, page 2.

6. Scope of Bamberg's Claims

33. According to Bamberg, "[t]he Bamberg claims, including the [Bamberg] claims that define the three Counts of the Interferences, do not include and should not be construed to include, a melting temperature . . . limitation for the white layer." Paper 225, page 5:18-20.

34. A review of the Bamberg claims designated as corresponding to the counts confirms Bamberg's point.

35. For example, Bamberg Claim 30 of Bamberg application 13/177,284 involved in Interference 105,964 reads:

> An image transfer article, comprising:
>
> an ink-receptive layer, including at least one surface configured to receive and carry indicia to be transferred; a polymer layer including ethylene acrylic acid underlaying the ink-receptive layer;
>
> a white layer underlaying the polymer layer, the white layer including *a pigment providing a substantially non-transparent, opaque background for received and transferred indicia*; and
>
> a silicone-coated removable substrate underlaying the white layer.

**Ex. 1519**, page 3:1-8; Paper 20, page 3:1-8 (italics added).

36. Bamberg states in its opposition that:

> The claim language regarding "white layer" explicitly states that the only requirement for the white layer of claim 30 is to have "a pigment providing a substantially non-transparent, opaque background for received and transferred indicia."

Paper 225, page 6:23-26.

37. Dr. Williams agrees that claim 30 does not include a melting temperature. **Ex. 2045**, page 32:17 to page 33:5.

38. The claims of Bamberg application 13/182,197 involved in Interference 105,961 likewise "do not contain any claim language requiring a melt temperature range." Paper 225, page 7:7-8.

39. Method claim 23 refers to the "white layer" as:

> at least one of the one or more polymer layers with a pigment, the pigment having a concentration or configuration sufficient to provide an opaque background for received indicia, when transferred to a base.

**Ex. 1520**, page 3:6-8.

40. The two Bamberg applications involved in Interference 105,966 do not "contain any claim language that includes or should be construed to include a melt temperature range . . ."

Paper 225, page 8:1-2.

41. For example, claim 1 of Bamberg application 13/12/233,541 defines the "white layer" as:

> . . . a release layer contacting the image transfer substrate and an image-imparting layer that comprises a polymer that includes indicia wherein the release layer is impregnated with one or more titanium oxide or other white pigment . . . .

**Ex. 1523**, page 3:3-6.

42. The involved Bamberg claims include within their scope:

(1) embodiments where the white layer is "non-fusible at ironing temperatures (i.e. [that is], up to about 220ºC)" and

(2) embodiments where the white layer is fusible at ironing temperatures *below* 220ºC.

## 6. Written Description Portion of Bamberg Specifications

43. Normally evaluation of a lack of adequate written description issues is based on the patent or application in which the claims appear. *Cf. Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1346 (Fed. Cir. 2000).

44. To establish what is contained in the written description portion of the Bamberg specifications, Dalvey refers to an English language translation of Bamberg PCT application PCT/IB99/00976 (filed 1 June 1999) and published as WO 00/73750 (7 Dec. 2000) (**Ex. 1001**).

45. Bamberg has not objected to Dalvey's use of the Bamberg PCT application, as opposed to its involved applications, to resolve Dalvey Motion .

46. Consistent with what appears to be the desire of the partie, we therefore decide the adequate written description issue on the basis of the Bamberg PCT application. *Cf. Brand v. Miller*, 487 F.3d 862, 869 (Fed. Cir. 2007) (in an interference the Board's role is one of an impartial adjudicator of an adversarial dispute between two parties).

47. There are at least two versions of the PCT application in the record. A first version is identified as Exhibit 1001 and contains Board Assigned Pages #1 through #23 (the Board assigns consecutive page numbers to all exhibits filed). A second version is also identified as Exhibit 1001and contains Board Assigned Pages #1285 through #1307. The pages of **Ex. 1001** referred to by the parties correspond to the Board Assigned Pages of the first version. Accordingly, we elect

to refer to the first version of **Ex. 1001**. We attach to this opinion a copy of **Ex. 1001** (Board **Ex. 3001**) consisting of Board Assigned Pages #2 through #23 with some of the hand-written line numbers for ease of reference.

48. According to Dalvey, "each and every embodiment described [in the Bamberg PCT application] includes a white layer that **must not melt** at temperature of up to 220ºC." (Bold in original, matter in brackets added). Paper 110, page 7:5-6.

49. Dalvey relies on various portions of the Bamberg PCT specification to support it "up to 220ºC" argument.

50. **Ex. 3001**, page #6:31 to #7:6 (Paper 110, page 7:12-16):

> The white background layer which is found directly on the adhesive layer, according to the present invention, comprises or is composed of permanently elastic plastics which are **non-fusible at ironing temperatures (i.e. [that is] up to about 220°C) and which are filled with white pigments – also non-fusible (up to about 220°C)**. The elastic plastics must not melt at ironing temperatures in order not to provide with the adhesive layer, e.g. the hot-melt, which provides the adhesion to the textile substrate, an undesired mixture with impaired (adhesive and covering) properties.

51. **Ex. 3001**, page #7:17-18 (Paper 110, page 7:17-18) (bold added):

> Suitable pigments are **only** those which do not melt at ironing on temperatures.

52. **Ex. 3001**, page #7:30-32 (Paper 110, page 7:19-21) (bold added):

> These pigments can be blended alone or also in a mixture with other non-fusible (**up to 220°C**) carrier agents such as for example silicates or aluminates.

53. **Ex. 3001**, page #16:6-29; see also Paper 110, page 7:27-30 (bold added):

> The coating method comprises the following steps . . . b) application of a white background layer composed of elastic plastics **which are non-fusible at ironing on temperatures (i.e. up to about 220°C)**, and which are filled with white, preferably inorganic, pigments onto the hot-melt layer, preferably with a with a resulting layer thickness of about 20-35 μm.

54. Original independent composition claim 1 of the Bamberg PCT application also requires "a white background layer composed of elastic plastics which are **non-fusible at temperatures up to 220ºC.**" **Ex. 3001**, page #20:8-9; Paper 110, page 7:31-33 (bold added).

55. Original independent method claim 14 calls for "application of a white background layer composed of elastic plastics non-fusible at temperatures (i.e. up to about 220ºC)." **Ex. 3001**, page #22:9-10; Paper 110, page 7:27-30.

56. The remaining original claims depend directly or indirectly from independent composition claim 1 or independent method claim 14.

## 7. Testimony of Ulf Bamberg

57. While somewhat unusual, named Bamberg inventor Ulf Bamberg was called to testify on behalf of Dalvey. **Ex. 2030**.

58. Mr. Bamberg testified about developing and testing of his invention. **Ex. 2030**, ¶¶ 3-7.

59. One concern is said to have been a need "to develop a white background layer that would bind effectively with the ink-receiving layer and adhesive layer and would not crack or erode during typical wear of the transfer substrate . . . ." **Ex. 2030**, ¶ 7:1-3.

60. Mr. Bamberg further testified as follows:

> In addressing the need for a white background layer that would retain a high level of contrast and resolution once transferred, via application of heat, to the transfer substrate, we came to understand that clarity and resolution are decreased where the white background layer is permitted to melt and mix with the ink-receiving layer and/or the adhesive layer, causing the white background layer to take on a hue of the transfer substrate color. Accordingly, we developed a white background layer that nonetheless formed a strong bind with the ink-receiving layer **but did not melt at conventional iron-pressing temperatures (i.e. [that is] temperatures up to about 220ºC)**.
>
> That the white background layer comprised an elastic plastic and did not melt and mix with the ink-receiving layer at conventional iron-pressing temperatures, yet had good adhesion with the adjacent layers, were very important to the Invention and were required aspects of the white background layer described in the . . . [Bamberg PCT application].

**Ex. 2030**, ¶¶ 9-10 (bold added).

8. Dalvey Disclosure

61. Consistent with *Agilent*, we turn to what is described in the descriptive portion of the Dalvey patents.

62. A point in dispute between the parties is whether the descriptive portion of the Dalvey specification describes "white layers" having a melting point below "about 220ºC."

63. In support of its discussion of the content of the Dalvey specifications, Dalvey refers to **Ex. 2013**—Dalvey U.S. Patent No. 6,884,311 B1 (Apr. 26, 2005) ("'311 Dalvey Patent"). The '311 Dalvey Patent has a few errors, particularly when it comes to descriptions of what is shown in the drawings. *See*, *e.g.*, Fig. 6 and compare with the discussion at col. 10:15-48 mentioning drawing numbers which do not appear in Fig. 6. Moreover, the '311 Dalvey Patent is not involved in the interferences. In order to avoid confusion, we refer to **Ex. 2040**—Dalvey U.S. Patent No. 7,749,581 B2, a Dalvey patent involved in Interference 105,964.

64. According to Bamberg, the "white layer" described by Dalvey does not melt at ironing temperatures (presumably meaning temperatures above about 220º C.). Paper 225, page 15:12-13.

65. In support of its position, Bamberg relies on the following:

> Because the polymeric component of the peel layer **520** generally has a high melting point, the application of heat, such as from an iron, does not result in melting of this layer or in a significant change in viscosity of the overall peel layer **520**. The change in viscosity is confined to the polymeric component that actually contacts the ink or toner and is immediately adjacent to the ink or toner.

*Id.*, **Ex. 2013**, col. 9:34-41; **Ex. 2040**, col. 9:33-39. We note that element **520** does not appear in the drawings.

66. Unlike Bamberg, Dalvey does not describe a minimum melting temperature.

67. Fig. 8 of the '311 Dalvey patent is reproduced below.

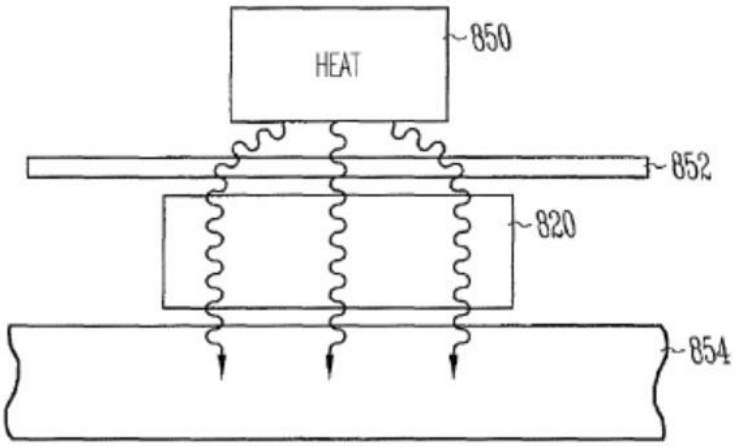


*Fig. 8*

Fig 8 depicts a a cross-sectional view of one process of image transfer onto a colored product.

68. Example 4 has the following to say about Fig. 8:

> As shown at **800** in Fig. 8, the peeled printed layers **820**, including at least one or more layers collectively comprising a white or luminescent pigment and received indicia, were then placed against a fabric **854** and covered with release paper **852**. Heat **850** was applied to the peeled printed layers **820** and the release paper **852**. The heat **850** was applied at 200 F, 225 F, 250 F, 300 F, 350 F, and 400 F. A good image transfer was observed for all of these temperatures.

**Ex. 2040**, col. 10:65 to col. 11:5.

69. The Farenheit temperatures described by Dalvey converted to Centigrade temperatures are set out below:

| Farenheit | Centigrade |
|---|---|
| 200 | ~93 |
| 225 | ~107 |
| 250 | ~121 |
| 300 | ~148 |
| 350 | ~177 |
| 400 | ~204 |

70. On the other hand, Bamberg describes iron-on temperatures in the range of 160 to 220ºC, preferably 170ºC. **Ex. 3001**, page 17:1-4; *see also* **Ex. 3001**, page 18:31 ("about 190ºC").

71. The iron-on temperatures described by Dalvey are consistent with the use of plastics that are viscous at temperatures lower than the plastics described by Bamberg.

9. Testimony of Dr. Williams and Dr. Risen

72. Dr. Williams explains why he could *not* find a Bamberg written description of a white layer that melted or was fusible at temperatures *below* 220ºC. **Ex. 2016**, ¶¶ 13, 15, and 18.

73. His testimony is based on his analysis of (1) portions of the Bamberg PCT priority document (**Ex. 2016**, ¶ 13) and (2) testimony of Ulf Bamberg (**Ex. 2016**, ¶ 19–20).

74. Dr. Risen, while generally addressing an adhesive layer, does not convincingly explain how the Bamberg PCT application adequately describes a "white layer" having a melting temperature *below* about 220 ºC.

75. Dr. Risen, while critical of Dr. Williams (**Ex. 1531**, ¶¶ 36–38), nowhere points to any portion of the Bamberg PCT application discussing a "white layer" having a melting point below about 200ºC.

76. To the extent there is a conflict between the testimony of Dr. Williams and that of Dr. Risen, we credit the testimony of Dr. Williams over that of Dr. Risen.

77. Unlike Dr. Risen, the facts and opinions stated by Dr. Williams are based on the relevant document, *viz.*, the Bamberg PCT application and are more consistent with than document than any opinion expressed by Dr. Risen.

10. Prosecution History of Bamberg Application 13/930,116

78. Dalvey calls attention to prosecution history in Bamberg Application 13/930,116—an application not involved in these interferences. Paper 110, page 8:24 to page 9:19.

79. In an Office Action dated 13 November 2013, the Examiner rejected then pending claims 1-11 and 13-20 based on a lack of a written description. Ex. 2008, page 2-3.

80. The Examiner found in connection with then-pending claims 1 and 19 that "[t]here is no support in the [descriptive portion of] the

specification for 'a softening point temperature of less than about 220 degree[s] C." *Id*. at page 3:1-2.

81. Claim 1 of Bamberg application 13/930,116 read at the time as follows:

> An image transfer article, comprising: an image-parting member having a softening point temperature less than about 220 degree[]C., the image-imparting member including (i) at least one surface configured to receive and carry indicia to be transferred, the at least one surface configured to be transferred in its entirety, and (ii) at least one portion of a pigment which, when transferred, provides an opaque background for received indicia; and a removable substrate disposed adjacent the image-imparting member.

**Ex. 2033**, page 2 (italics added).

82. Assigning any weight to the prosecution history is somewhat difficult other than to note that Dr. Williams' opinion with respect to lack of a written description relating to the melt temperature is consistent with the Examiner's rejection. **Ex. 2016**, ¶¶ 21-22.

11. Additional Finding

83. The specifications of the involved Bamberg applications do not contain an adequate written description of the subject matter claimed in those applications.

C. Analysis

1. *Agilent*-based Analysis

Bamberg copied claims from the Dalvey patents to provoke the interference.

Accordingly, the scope of the copied claims is to be determined based on the written description of the Dalvey patents. *Agilent Technologies, Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1377 (Fed. Cir. 2009).

In so many words, Dalvey does not describe a "white layer" that comprises "plastics which are [required to be] non-fusible at ironing temperatures (i.e., up to about 220º C) . . . ." (**Ex. 1001**, page 6:28-35.

Therefore, under *Agilent*, the Bamberg claims are to be construed as "generic" claims for the purpose of determining whether Bamberg describes the Dalvey inventions.

We find that Dalvey describes a "generic" invention where any suitable white layer may be used whereas Bamberg describes a "sub-generic" invention within the scope of Dalvey's "generic" invention where the Bamberg white layer must be made of plastics that are non-fusible at ironing temperatures "up to about 220ºC."

Dalvey does not require use of a plastic that is non-fusible at ironing temperatures up to about 220ºC.

When Bamberg's claims are construed pursuant to *Agilent*, we next look to the descriptive portion of the Bamberg specification with the view to determining whether Bamberg describes the Dalvey "generic" invention.

As is apparent from our findings, we find that Bamberg does not describe Dalvey's "generic" invention.

It follows that under *Agilent*, Bamberg lacks the necessary written description and therefore the Bamberg claims involved in the interference are not patentable to Bamberg.

2. Non-*Agilent* Analysis

In opposing Dalvey Motion 3, Bamberg does not expressly concede that *Agilent* is applicable precedent as applied to these interferences.

Rather, we understand that Bamberg is arguing that (1) the principles of *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) apply, (2) words of the involved Bamberg claims should be given their ordinary meaning, (3) when the words are given their ordinary meaning the claims should be construed broadly to cover what we have referred to as a "generic" invention, and (4) the descriptive portion of the involved Bamberg specification support a "generic" invention. Paper 225, page 2:21 through page 3:12.

Bamberg goes on to say that limitations from a specification cannot be read into the claims. *Id*. page 3:13-24.

Basically, what Bamberg may be arguing is that the Bamberg claims should be construed in light of the descriptive portion of the Bamberg specifications. *Cf. United States v. Adams*, 383 U.S. 39, 49 (1966), claims of a patent limit the invention and the specification cannot be used to broaden the invention; nevertheless claims are to be construed in light of the specification and both the specification and claims are to be read with a view to ascertaining the invention); *Am. Fruit Growers v. Brogdex Co.*, 283 U.S. 1, 5 (1931) (the claim of a patent must always be explained by and read in connection with the specification).

Assuming *arguendo* that *Agilent* is not applicable precedent, as our above-discussed findings make clear, we would reach the same finding, *viz.*, the descriptive portion of the Bamberg specifications do not provide an adequate written description of a "white layer" made of plastics that are non-fusible at ironing temperatures *below* about 220ºC.

Thus, apart from *Agilent*, it still follows that the broadly claimed Bamberg subject matter is not described in the descriptive portions of the Bamberg specifications.

### D. Decision

For the reasons given, Dalvey Motion 3 is *granted*, based solely on a failure of Bamberg to satisfy the written description requirement of the first paragraph of 35 U.S.C. § 112.

We have not considered or decided any issue in connection with Dalvey's lack of enablement arguments.

## VI. Bamberg Responsive Motion 5

### A. Background

In response to Dalvey Motion 3 (lack of written description), Bamberg Responsive Motion 5 requests entry of amendments in Bamberg applications:

(1) Bamberg application 13/182,197 (Paper 130, Appendix 3);

(2) Bamberg application 13/177,284 (Paper 130, Appendix 5);

(3) Bamberg application 13/223,541 (Paper 130, Appendix 7); and

(4) Bamberg application 13/207,236 (Paper 130, Appendix 9)

Dalvey has opposed. Paper 217.

Bamberg has replied. Paper 258.

B. Facts

1. Requirement for a Claim Chart

1. The rules provide that the Board may authorize a party to file a responsive motion to add amended claims. 37 C.F.R. § 41.121 (a)(2).

2. The rules specifically provide:

> Any motion to add a claim must include . . . [a] claim chart showing where the disclosure of the . . . application provides written description of the subject of the claim . . . .

37 C.F.R. § 41.110(c)(2).

3. The Standing Order (Paper 2) also discusses the need for claim charts. Standing Order ¶ 110.

4. Paragraph 110 states that "[a] movant seeking to add a claim must comply with the requirements of Bd.R. 110(c) for the proposed claim." Standing Order, ¶ 110 (first sentence).

5. The Federal Register Notice of Final Rule advises that "a movant adding a claim must show where the written description for the claim can be found (§ 41.110(c)(2))." 69 Fed. Reg. 49960, 49995 (col. 2, first full paragraph, second sentence) (Aug. 12, 2004).

6. The requirement for a claim chart serves a highly useful function in administration of interferences.

7. Often an argument opposing a motion to add claims is a lack of written description as to those claims.

8. A party seeking to add a claim, and providing a claim chart, puts the opponent on notice of why the moving party believes the subject

matter proposed added claim is supported by an adequate written description.

9. The claim chart permits the opponent to focus on those claimed limitations that an opponent believes are not supported by an adequate written description.

10. Any opposition can then address why the information in the claim chart is not adequate to confirm support for a written description of particular limitations.

11. The moving party may then file a reply with any observations in its opponent's opposition.

12. Failure to file a claim chart complicates administration of interference cases and is contrary to the policy objectives of the Director that proceedings under Part 41 be conducted in a just, speedy, and inexpensive manner. 37 C.F.R. § 41.1(b).

13. Where a party does not provide a claim chart, the opponent—a party not having the burden of proof—out of an abundance of caution may feel that it has to discuss in the first instance where a particular limitation is not supported by an adequate written description.

14. In that case, the moving party addresses the opponent's observations in its reply.

15. However, the rules do not authorize an opponent to file a sur-reply.

16. The opponent, therefore, would not have a fair opportunity to address a moving party's views on where the descriptive portion of the specification describes any contested limitation.

17. It is possible, of course, that the Board can authorize a sur-reply. However, authorizing a sur-reply burdens both the opponent and the Board.

18. If a party complies with the rules, no occasion arises (1) for the opponent to ask for a conference call to seeking authorization to file a sur-reply, (2) for the conference call, (3) for additional resources to be expended by the opponent in preparing and filing a sur-reply, and (4) possible delay in reaching a final resolution of the interference.

### 2. Bamberg—No Claim Chart Provided

19. Bamberg did not provide a claim chart with its Responsive Motion 5.

20. The lack of a claim chart was called to our attention, as well as to the attention of Bamberg, in Dalvey Opposition 5. Paper 217, page 1:22 through page 2:2.

21. Notwithstanding this fact, we have not found in Bamberg Reply 5 any discussion responsive to Dalvey's opposition observation concerning the lack of claim chart.

22. Bamberg Motion 5 was accompanied by a Statement of Facts. Paper 130, Appendix 2.

23. Dalvey Opposition 5 admits or denies facts set out by Bamberg. Paper 217, Appendix 2.

24. Dalvey Appendix 2 does not set out any additional facts.

25. A conference call was held on 12 May 2014 after which a Post Conference Call Order was entered. Paper 139.

26. Dalvey observes that:

> [i]n view of the Board's Post Conference call Order entered May 12, 2014 (Paper 139), page 8, indicating that the parties may, but no longer requiring the parties to, continue using a statement facts in opposition and replies, however, Dalvey has not provided additional facts in Appendix 2 instead opting to provide all facts in the body of the opposition, as requested [by the Board] during the telephone conference of May 1, 2014.

Paper 217, page 1:13-17.

27. The order provided , *inter alia*, that "[t]he parties may continue to use [a] statement of facts in opposition and replies." Paper 139, page 8.

28. Bamberg maintains that Dalvey "misread this Order." Paper 258, page 1:10.

29. As a result of Dalvey's failure to supply additional facts (to be admitted or denied), Bamberg says that it "is now unable to respond properly to Dalvey's additional 'material facts' . . . [Bamberg's] opposition." Paper 258, page 1:15-16.

30. Dalvey did not "misread this Order."

31. Rather, by use of the word "may", the judge assigned to the interferences authorized—consistent with the rules—facts to be set out in (1) the body of an opposition or reply or (2) a statement of facts. 37 C.F.R. § 41.104(b) (a rule may be waived); 37 C.F.R. § 121(d) (requiring a statement of facts).

32. Dalvey elected to set out its additional facts in the body of its opposition and we find no fault in Dalvey having done so.

33. Moreover, Dalvey Opposition 5 plainly factually states that Bamberg did not supply the required claim chart. Paper 217, page 2:1-2.

C. Analysis

A party seeking to add a new claim has the burden of establishing that the new claim is supported by an adequate written description. 37 C.F.R. § 41.121(b).

Because of the burden, the moving party must establish that all, not just some, limitations in the claim proposed to be added are supported by an adequate written description. In other words, the claim as a whole—as opposed to a limitation of the claim—must be supported.

The Director has determined that the burden is best satisfied with a claim chart. 37 C.F.R. § 41.110(c)(2).

Contrary to the Director's policy requiring a claim chart, Bamberg in its statement of facts details only where some, but not all, of the claimed limitations that are said to be supported in the descriptive portion of the specification.

Thus, Bamberg left Dalvey to figure out in the first instance whether the proposed new claims are adequately supported—but that was not Dalvey's burden.

Proposed new claim 39, to be added to involved Bamberg application 13/182,197, calls for "an adhesive layer with a softening point [that is] *less* than about 220ºC . . . ." Paper 130, Appendix 3, page 11-5 (italics added).

For example, according to Bamberg, "[t]he temperature range for new claim 39 is supported in the specification of the Bamberg [PCT] priority application. Ex. 1001 at 6[5], 8[2], 7[3], 8[5], 10[2] and 18[6]. Paper 130, page 18, Fact 22.

A first difficulty with Fact 22 is that we are not sure what is meant by 6[5].

A second difficulty is that a computer word search of **Ex. 1001** does not reveal any mention of the word "softening."

A third difficulty is that even if there were support for the limitation, Bamberg still would not have satisfied its burden to show that the claim *as a whole* is supported by an adequate written description.

A fourth difficulty is that the proposed new claim needs to be supported in the involved Bamberg application. Showing that a claim is supported in a priority application does not necessarily establish support in an involved application.

Bamberg's election not to present a claim chart ultimately amounts to a subtle way of shifting the burden of proof to Dalvey.

The shift becomes apparent from the remarks in the Bamberg reply concerning its alleged "inability" to respond to Dalvey's opposition due to an alleged failure on the part of Dalvey to present additional facts in a statement of facts.

To the extent that Bamberg had an "inability," that "inability" is a self-imposed hardship brought on by Bamberg's failure to supply a claim chart in the first instance.

### D. Decision

For the reasons given, Bamberg Motion 5 is *denied*.

## VII. Dalvey Miscellaneous Motion 8

Dalvey Miscellaneous Motion 8 seeks exclusion of some of Bamberg's evidence.

However, with one exception, none of the evidence sought to be excluded has been relied upon by Bamberg in connection with Dalvey Motion 3 or Bamberg Motion 5.

The exception is a part of the direct declaration testimony of Dr. Williams related to enablement. **Ex. 2016**, ¶¶ 36-38.

We have not found it necessary to consider ¶¶ 36-38. We did not find it necessary to reach enablement because we found that Dalvey sustained its burden with respect to Dalvey Motion 3 based on lack of written description.

Accordingly, we need not further consider Dalvey Miscellaneous Motion 8.

Dalvey Miscellaneous Motion 8 is *dismissed* without prejudice to further consideration should it become necessary.

## VIII. Bamberg Miscellaneous Motion 7

Bamberg Miscellaneous Motion 7 seeks exclusion of some of Dalvey's evidence.

However, none of the evidence sought to be excluded has been relied upon in connection with Dalvey Motion 3 or Dalvey Opposition 5.

Accordingly, we need not further consider Bamberg Miscellaneous Motion 7.

Bamberg Miscellaneous Motion 7 is *dismissed* without prejudice to further consideration should it become necessary.

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# Appendix 1

Copy of Paper 178

Fourth Redeclaration

BoxInterferences@uspto.gov
Telephone: 571-272-4683

Paper 178
Entered: 22 May 2014

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT TRIAL AND APPEAL BOARD

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JODI A. **DALVEY** and NABIL F. NASSER, *Junior Party*,
v.
ULF **BAMBERG**, PETER KUMMER and ILONA STIBUREK, *Senior Party*.

---

*Interference 105,961 McK*
Daley Patent 7,754,042 B2
v.
Bamberg Application 13/182,197

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*Interference 105,964 McK*
Dalvey Patent 7,749,581 B2, Patent 7,766,475 B2
Patent 8,361,574 B2, and Patent 8,703,256 B2
v.
Bamberg Application 13/177,284

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*Patent Interference 105,966 McK*
Dalvey Patent 7,771,554 B2 and RE 41,623 E
v.
Bamberg Application 13/207,236 and Application 13/223,541

---

Before: FRED E. McKELVEY, *Administrative Patent Judge*.

**FOURTH REDECLARATION**

## I. Introduction

This Fourth Redeclaration is being entered to consolidate in one paper all relevant information in (1) Interference 105,961, (2) Interference 105,964, and (3) Interference 105,966.

Unless otherwise noted, a reference to a Paper is to a Paper filed in Interference 105,964.

It is noted that in some patents inventor Nassar's first name is listed as "Nabil" whereas in other places in the record the name is listed as "Nabill". This fourth redeclaration uses the first name "Nabil".

## II. Declarations and previous redeclarations of the interferences

### A. Interference 105,961

Interference 105,961 was declared on 26 September 2013. Interference 105,961, Paper 1.

### B. Interference 105,964

Interference 105, 964 was declared on 26 September 2013. Paper 1.

A "first" redeclaration order was entered in Interference 105,964 on 27 November 2013. Paper 40.

### C. Interference 105,966

Interference 105,966 was declared on 26 September 2013. Interference 105,966, Paper 1.

A "second" redeclaration order was entered in Interference 105,966 on 27 November 2013. Interference 105,966, Paper 42.

A "third" redeclaration order was entered in Interference 105,966 on 4 March 2014. Interference 105,964, Paper 124.

## III. Papers in interferences

The file of Interference 105,961 contains Papers 1-40, as well as a transfer order.

The file of Interference 105,966 contains Papers 1-45, as well as a transfer order.

With the exception of transfer orders, since February of 2014, all papers in all interferences have been entered as papers in Interference 105,964.

All papers will continue to be entered in Interference 105,964, until a final decision and judgment is entered in Interference 105,964, at which time a copy of the final decision and judgment will be entered in Interference 105,961 and Interference 105,966.

As set out in this "fourth" redeclaration, Count 1 continues to appear in Interference 105,964. Count 2 appears in Interference 105,961 (replacing Count 1 of that interference). Count 3 appears in Interference 105,966 (replacing original Count 1 of that interference).

## IV. Interference 105,961

### A. Identification and order of the parties

#### 1. Junior Party (1 patent)

| | |
|---|---|
| Named Inventors: | Jodi A. Dalvey, Minnesota<br>Nabil F. Nasser, Minnesota |
| Patent: | US 7,754,042 B2<br>issued 13 July 2010<br>based on application 12/193,573<br>filed 18 August 2008 |
| Patent Pub: | U.S. Patent Publication 2008/0305253 A1<br>11 December 2008 |

| | |
|---|---|
| Title: | Method of image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

2. Senior Party (1 application)

| | |
|---|---|
| Named Inventors: | Ulf Bamberg, Germany[1]<br>Peter Kummer, Switzerland<br>Ilona Stiburek, Switzerland |
| Application: | Application 13/182,197,<br>filed 13 July 2011 |
| Patent Pub: | U.S. Patent Publication 2012/0120170 A1<br>17 May 2012 |
| Title: | Ink-jet transfer system for dark textile substrates |
| Assignee: | Arkwright Advanced Coating, Inc. |

B. Count, claims of the parties, and accorded benefit

1. Count 2[2]

A method according to Claim 23 of Bamberg application 13/182,197

or

a method according to Claim 1 of Dalvey Patent 7,754,042.

[1] The PTAB understands that inventor Bamberg now resides in Australia.

[2] Count 2 replaces Count 1 of Interference 105,961. Original Count 1 of Interference 105,961 called for a "device" but it is clear from the claims mentioned in original Count 1 (now Count 2) that a method—not a device—is involved.

2. Claims of the parties

The claims of the parties are:

Dalvey: 1-22

Bamberg: 23-34

The claims of the parties corresponding to Count 2 are:

Dalvey: 1-22

Bamberg: 23-34

The claims of the parties *not* corresponding to Count 2 are:

Dalvey: None

Bamberg: None

3. Benefit

The parties are accorded the following benefit for Count 2:

Dalvey: Application 12/193,573, filed 18 August 2008
Application 12/034,392, filed 21 February 2008
Application 10/911,249, filed 04 August 2004
Application 09/541,845, filed 03 April 2000
Application 09/391,910, filed 09 September 1999

Bamberg: Application 13/182,197, filed 13 July 2011
Application 12/977,555, filed 23 December 2010
Application 09/980,466, filed 12 April 2006
Int'l Application IB99/00976, filed 01 June 1999

## V. Interference 105,964

### A. Identification and order of the parties

#### 1. Junior Party (4 patents)

**a. First patent**

Named Inventors: Jodi A. Dalvey, Minnesota
Nabil F. Nasser, Minnesota

| | |
|---|---|
| Patent: | US 7,749,581 B2<br>issued 06 July 2010<br>based on application 12/193,578<br>filed 18 August 2008 |
| Patent Pub: | U.S. Patent Publication 2008/0305288 A1<br>11 December 2008 |
| Title: | Image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

**b. Second patent**

| | |
|---|---|
| Named Inventors: | Jodi A. Dalvey, Minnesota<br>Nabil F. Nasser, Minnesota |
| Patent: | US 7,766,475 B2<br>issued 03 August 2010<br>based on application 12/193,562<br>filed 18 August 2008 |
| Patent Pub: | U.S. Patent Publication 2008/0302473 A1<br>11 December 2008 |
| Title: | Image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

**c. Third patent**

| | |
|---|---|
| Named Inventors: | Jodi A. Dalvey, Minnesota<br>Nabil F. Nasser, Ohio |
| Patent: | US 8,361,574 B2<br>issued 29 January 2013<br>based on application 12/875,445<br>filed 03 September 2010 |

| | |
|---|---|
| Patent Pub: | U.S. Patent Publication 2010/0323132 A1<br>23 December 2010 |
| Title: | Image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

**d. Fourth patent**

| | |
|---|---|
| Named Inventors: | Jodi A. Schwendimann, Minnesota<br>Nabil F. Nasser, Ohio |
| Patent: | US 8,703,256 B2<br>issued 22 April 2014<br>based on application 13/745,995<br>filed 21 January 2013 |
| Patent Pub: | U.S. Patent Publication 2013/0142970 A1<br>06 June 2013 |
| Title: | Image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

2. Senior party (1 application)

| | |
|---|---|
| Named Inventors: | Ulf Bamberg, Germany<br>Peter Kummer, Switzerland<br>Ilona Stiburek, Switzerland |
| Application: | Application 13/177,284,<br>filed 06 July 2011 |
| Patent Pub: | U.S. Patent Publication 2012/0092429 A1<br>19 April 2012 |
| Title: | Ink-jet transfer system for dark textile substrates |

Assignee: Arkwright Advanced Coating, Inc.

B. Count, claims of the parties, and accorded benefit

1. Count 1

An image transfer article according to Claim 30 of Bamberg application 13/177,284

or

an image transfer article according to Claim 1 of Dalvey Patent 7,749,581

or

an ink-jet transfer article according to Claim 1 of Dalvey Patent 7,766,475 B2

or

an image transfer article according to Claim 15 of Dalvey Patent 8,361,574 B2

or

an image transfer article according to Claim 1 of Dalvey Patent 8,703,256 B2.

2. Claims of the parties

The claims of the parties are:

Dalvey: 1-31 (US Patent 7,749,581 B2)
1-21 (US Patent 7,766,475 B2)
1-20 (US Patent 8,361,574 B2)
1-20 (US Patent 8,703,256 B2)

Bamberg: 30-49

The claims of the parties corresponding to Count 1 are:

Dalvey: 1-31 (US Patent 7,749,581 B2
1-21 (US Patent 7,766,475 B2)
1-20 (US Patent 8,361,574 B2)
1-20 (US Patent 8,703,256 B2)

Bamberg: 30-49

The claims of the parties *not* corresponding to Count 1 are:

Dalvey: None

Bamberg: None

3. Benefit

The parties are accorded the following benefit for Count 1:

Dalvey (US Patent 7,749,581 B2):
Application 12/193,578, filed 18 August 2008
Application 12/034,932, filed 21 February 2008
Application 10/911,249, filed 04 August 2004
Application 09/541,845, filed 03 April 2000
Application 09/391,910, filed 09 September 1999

Dalvey (US Patent 7,766,475 B2):
Application 12/193,562, filed 18 August 2008
Application 12/034,932, filed 21 February 2008
Application 10/911,249, filed 04 August 2004
Application 09/541,845, filed 03 April 2000
Application 09/391,910, filed 09 September 1999

Dalvey (US Patent 8,361,574):
Application 12/875,445, filed 03 September 2010
Application 10/911,249, filed 04 August 2004
Application 09/541,845, filed 03 April 2000

Dalvey (US Patent 8,703,256):

Application 13/745,995, filed 21 January 2013
Application 12/875,445, filed 03 September 2010
Application 10/911,249, filed 04 August 2004
Application 09/541,845, filed 03 April 2000
Application 09/391,910, filed 09 September 1999

Bamberg:

Application 12/977,555, filed 23 December 2010
Application 09/980,466, filed 12 April 2006
Int'l Application IB99/00976, filed 01 June 1999

## VI. Interference 105,966

### A. Identification and order of the parties

#### 1. Junior Party (1 patent and 1 reissue)

**a. Patent**

| | |
|---|---|
| Named Inventors: | Jodi A. Dalvey, Minnesota<br>Nabil F. Nasser, Minnesota |
| Patent: | US 7,771,554 B2<br>issued 10 August 2010<br>based on application 12/034,932<br>filed 21 February 2008 |
| Patent Pub: | U.S. Patent Publication 2008/0149263 A1<br>26 June 2008 |
| Title: | Image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

**b. Reissue patent**

| | |
|---|---|
| Named Inventors: | Jodi A. Schwendimann<br>a/k/a Jodi A. Dalvey, Minnesota<br>Nabil F. Nasser, Minnesota |

| | |
|---|---|
| Patent: | RE 41,623 E, issued 07 September 2010<br>(US Patent 6,884,311 issued 26 April 2005)<br>based on application 12/218,260<br>filed 11 July 2008 |
| Title: | Method of image transfer on a colored base |
| Assignee: | Jodi A. Schwendimann |

2. Senior Party (2 applications)

**a. First application**

| | |
|---|---|
| Named Inventors: | Ulf Bamberg, Germany<br>Peter Kummer, Switzerland<br>Ilona Stiburek, Switzerland |
| Application: | Application 13/223,541,<br>filed 01 September 2011 |
| Patent Pub: | U.S. Patent Publication 2012/0105560 A1<br>03 May 2012 |
| Title: | Ink-jet transfer system for dark textile substrates |
| Assignee: | Arkwright Advanced Coating, Inc. |

**b. Second application**

| | |
|---|---|
| Named Inventors: | Ulf Bamberg, Germany<br>Peter Kummer, Switzerland<br>Ilona Stiburek, Switzerland |
| Application: | Application 13/207,236,<br>filed 10 August 2011 |
| Patent Pub: | U.S. Patent Publication 2012/0120132 A1<br>17 May 2012 |
| Title: | Ink-jet transfer system for dark textile substrates |
| Assignee: | Arkwright Advanced Coating, Inc. |

B. Count, claims of the parties, and accorded benefit

1. Count 3

A method according to Claim 1 of Bamberg application 13/207,236,

or

a method[3] according to Claim 1 of Bamberg application 13/223,541,

or

a method according to Claim 1 of Dalvey RE 41,623 E,

or

a method according to Claim 1 of Dalvey Patent 7,771,554 B2.

2. Claims of the parties

The claims of the parties are:

Dalvey: 1-17 (RE 41,623 E)
1-14 (US Patent 7,771,554 B2)

Bamberg: 1-14 (Application 13/207,236)
1-17 (Application 13/223,541)

The claims of the parties corresponding to Count 3 are:

Dalvey: 1-17 (RE 41,623 E)
1-14 (US Patent 7,771,554 B2)

Bamberg: 1-14 (Application 13/207,236)
1-17 (Application 13/223,541)

The claims of the parties *not* corresponding to Count 3 are:

Dalvey: None

Bamberg: None

[3] Count 3 replaces Count 1 of Interference 105,966. Count 1 of Interference 105,966 calls for a "device" but it is clear from the claims mentioned in Count 1 (now Count 3) that a method—not a device—is involved.

### 3. Benefit

The parties are accorded the following benefit for Count 3:

Dalvey (RE 41,623 E):
Application 12/218,260, filed 11 July 2008
Application 09/541,845, filed 03 April 2000
Application 09/391,910, filed 09 September 1999

Dalvey (US Patent 7,771,554 B2):
Application 12/034,932, 21 February 2008
Application 10/911,249, filed 04 August 2004
Application 09/541,845, filed 03 April 2000
Application 09/391,910, filed 09 September 1999

Bamberg (both applications):
Application 12/977,555, filed 23 December 2010
Application 09/980,466, filed 12 April 2006
Int'l Application IB99/00976, filed 01 June 1999

cc (via Electronic mail):

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Thorsten Schmmidt, Esq. (tschmidt@schmidt-llc.com)

# Appendix II

Exhibit 3001

InTransCo, Inc.
INTERNATIONAL TRANSLATION COMPANY

TRANSLATIONS FROM AND INTO ALL LANGUAGES PREPARED BY SPECIALISTS

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## VERIFICATION OF TRANSLATION

Title of Translated Document: **Ink-jet transfer systems for dark textile substrates**

**PCT/IB99/00976**

Original Language of Translated Document: **German**

The undersigned declares that:

I am a professional translator representing InTransCo, Inc., with English as a native language and German as an acquired language. I have over thirty years of full-time translating experience in general, technical, chemical and related fields.

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Date: 11/1/13 Signature: A. M. Russell

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**Ink-jet transfer systems for dark textile substrates**

Technical Field

The present invention relates to an ink-jet transfer system or an ink-jet transfer print, respectively, according to the preamble of claim 1, as well as a method according to the independent claims 14 and 16.

Background Art

Transfer prints enjoy a big popularity, as they allow the application of any graphic presentation, patterns, images or type faces, in particular on clothes like T-shirts, sweatshirts, shirts or also other textile substrates like for instance mouse-pads. Of particular interest are ink-jet transfer systems (ink-jet transfer prints), providing the potential users with the possibility of an individual selection of electronically processible and by means of graphic presentations which can be stored on a computer, and which can eventually be printed or ironed on, respectively, onto his desired garment or another textile substrate (support), respectively, by the user himself. Thereby, in a first step, the desired, electronically processible image is produced by the user of the transfer print by means of a computer, which is transmitted from the computer to a suitable printer, for example an ink-jet printer, which in turn prints the desired image onto the transfer system. The transfer print thus prepared has to display a structure which allows the further use for printing onto for example a textile substrate. By means of a suitable transfer print, the desired graphic presentation is brought to adhesion onto the desired textile substrate. Usually, graphic presentations are applied under supply of heat and pressure by a hot copy, and optionally by a prior cold copy onto the desired textile substrate.

In recent years, efforts have been undertaken in order to improve the hot transfer systems as well as to enable the printing of the desired graphic presentation onto the textile substrate with a satisfactory quality.

For instance, US-5,242,739 describes a heat-sensitive transfer paper which is capable of receiving an image and comprises the following components: a) a flexible cellulose containing, unwoven, textile-like paper which has a superior and an inferior surface and b) a melting transfer-film layer which is capable of receiving an image, and which is situated onto the superior surface of the paper support, c) as well as optionally an intermediary hot-melt layer. The film layer is composed of about 15 to 80 weight-% of a film-forming binder and about 85 to about 20 weight-% of a powder like thermoplastic polymer, whereby the film-forming binder and the thermoplastic polymer have a melting point of between about 65°C and 180°C.

US-5,501,902 represents a further development of US-5,242,739, which is composed of a two-layer system as well, whereby, however, for the improvement of the printing image, an ink viscosity agent is further contained. Furthermore, in the transfer print of US-5,501,902, preferably a cationic, thermoplastic polymer is contained for the improvement of the ink-absorbing capacity.

As pigments for the receipt of the ink dyestuff, in the prior art, usually polyesters, polyethylene wax, ethylene-vinylacetate copolymers, and as a binder, polyacrylates, styrene-vinylacetate copolymers, nitrile rubber, polyvinylchloride, polyvinylacetate, ethylene acrylate copolymers and melamine resins are mentioned.

In WO 98/30749 (Océ-Switzerland) an ink-jet transfer system is described, which comprises a carrier material, a hot-melt layer being applied onto the carrier material and at least an ink-receiving layer. Thereby, the ink-receiving layer is a mixture of a highly porous pigment

and a binder, whereby the molecules of the pigment and optionally of the binder as well as optionally of the hot-melt are capable of forming chemical bonds with the dyestuff molecules of the ink.

A special difficulty, however, is associated with transfer prints, which shall be applied onto a dark textile support. Since the dyestuffs are transparent against dark backgrounds, i.e. maximally perceptible as shadow, first of all a light contrast background has to be created to make the desired colored image better visible. According to the prior art, for this, in the course of a 2-step method or a one-step method, a transfer print is applied onto a dark piece of textile. In case of the conventional 2-step method, a white textile fabric equipped with a hot-melt adhesive on the back is laminated with a transfer foil that was imprinted by a xerographic method (or ink-jet) and then pressed with the hot-melt adhesive side on the dark garment to be imprinted (T-shirt) by means of a transfer press at ca. 180°C and a pressure of about 7 bar. The image side with the thin foil (transfer layer) on it thereby is protected by a silicone paper. After the transfer operation that lasts about 10 seconds, the silicone paper is removed. The adhesion of the transfer print system on the dark garment is achieved by means of a polyethylene or polyester/polyamide textile adhesion (i.e. a hot-melt adhesive) of the contrast support on the textile substrate.

The whole system is felt to be unpractical by the user in so far as one needs a laminator and/or a textile transfer press for the realization of the method, whereby in particular the washproofness or the adhesion of the white contrast support on the dark piece of textile, respectively, still is particularly unsatisfactory and in addition is appreciably impaired with each washing.

The known systems that are usable by means of a one-step method are based on a white, thick transfer foil

with a thickness of about 400 to 600 μm which can be imprinted by an ink-jet method or a xerographic method and subsequently transferred on a dark piece of textile by means of a transferred press. The disadvantages of this system are in particular the unsatisfactory image quality immediately after the transfer on the piece of textile. The images look faint and blurred. Furthermore, the whole system is comparatively thick, makes an unaesthetic impression (armor-like) and it is not breathable. An additional major disadvantage is the fact that the user who does not have available a transfer press and consequently switches to the use of a commercially available iron is confronted with a sustainably impaired adhesion of the transfer foil on the piece of textile. This loss of adhesion is further accelerated by repeated washings.

A further disadvantage of both conventional print systems is their application process on the textile substrate, whereby the application of a contrast background on the piece of textile under markedly high pressure cannot be performed by private persons without adequate equipment. The pressures of at least about 7 bar (= $7x10^5$ Pa) often required for this can only be generated by a cost-intensive transfer press, whereby the users are mainly interested in a simple ironing on by means of a commercially available iron. The above mentioned disadvantages did significantly lead to the consequence that the currently sold transfer print systems did not become widely distributed in the market as desired, or were not very successful, respectively. On the contrary there still exists a great need for satisfactory systems that do not have the above-mentioned disadvantages.

## Disclosure of the Invention

Hence, it was one objective of the present invention to provide a textile transfer print system which at

least partly avoids the above-mentioned disadvantages. In particular, a transfer print system for a dark textile support should be provided which on the one hand yields the desired high contrast, a high resolution, and on the other hand avoids the unsatisfactory washproofness due to insufficient adhesion of the transfer print on the textile support, and finally which can be applied on a piece of textile as uncomplicated and efficiently as possible i.e. in the course of a one-step method by means of an iron.

Furthermore, it was also an objective of the present invention to provide a method for the production of textile transfer print systems for dark textile substrates with high washproofness.

Finally, it was an objective of the present invention to provide a printing process, whereby by means of textile transfer print systems for dark textile substrates, graphic presentations with high quality or high washproofness, respectively, can be applied on textile substrates in a single step.

The above-mentioned objectives are resolved according to the independent claims. Preferred embodiments are mentioned in the dependent claims.

The ink-jet transfer system according to the present invention comprises or is composed of, respectively, a carrier material (base layer), an adhesive layer applied on the carrier material - preferably a hot-melt layer - which has dispersed spherical (globular) polyester particles of a granular size of less than 30 µm, a white background layer being applied on the adhesive layer and at least one ink-receiving layer being applied on the background layer. The white background layer which is found directly on the adhesive layer, according to the present invention, comprises or is composed of permanently elastic plastics which are non-fusible at ironing temperatures (i.e. up to about 220°C) and which are filled with white

pigments - also non-fusible (up to about 220°C). The elastic plastics must not melt at ironing temperatures in order not to provide with the adhesive layer, e.g. the hot-melt, which provides the adhesion to the textile substrate, an undesired mixture with impaired (adhesive and covering) properties. Furthermore, the white background layer has to be elastic in order not to lead to a brittle fracture by subsequent mechanical stresses. Elasticity, in the sense of the present invention, means an expansion of at least 200%, preferably of between 500-1000% and in particular preferably of about 800%.

Preferred elastic plastics for the white background layer are selected from the group comprising the polyurethanes, polyacrylates or polyalkylenes or also natural rubber (latex), respectively. The most preferred elastic plastics contain or are composed of polyurethanes.

Suitable pigments are only those which do not melt at ironing on temperatures. The filled white layer or the polymers contained therein, respectively, such as e.g. polyurethane must not melt, because otherwise the white pigments would sink or penetrate, respectively, into the textile substrate. Associated with this would be a reduction or even a destruction, respectively, of the white background color which according to the invention shall be provided to provide a background for dark prints. Particularly preferred white pigments are inorganic pigments selected from the group comprising $BaSO_4$, ZnS, $TiO_2$, ZnO, SbO. Also organic pigments are usable for the white background layer as long as they are non-fusible at ironing on temperatures. These pigments can be blended alone or also in a mixture with other non-fusible (up to 220°C) carrier agents such as for example silicates or aluminates.

Thus, the present invention succeeds in providing a transfer system which has a white background layer in the print system itself, i.e. between the adhesive layer

and the ink-receiving layer, whereby the entire system, in spite of the non-fusible white background layer, surprisingly fulfills the following requirements:

a) All of the 4 chemically different layers are compatible, in particular chemically, in the course of the coating process, as well as the melting process (the ironing onto the textile substrate). There occurs no beading or detachment, respectively, of the white background layer from the adhesive layer and/or the ink-receiving layer from the white background layer.

b) The 4 chemically different layers furthermore show a good adhesion to each other after production of the transfer system so that there is no splintering off or detachment, respectively, of single layers of the transfer system that is ironed on the textile substrate.

c) The transfer system shows also an excellent adhesion and elasticity on the textile substrate, particularly after ironing on the textile substrate. Said elasticity is of great importance since the ironed-on transfer system should not become brittle and should not effect a sustainable impairment of the graphic presentation on the textile substrate. Particularly in case of sports stresses (e.g. pulling at or crumpling of the T-shirt, respectively) the image imprinted on the textile support has to adhere tightly.

d) Finally, the inventive transfer system is washable as a composite on the textile substrate without adversely affecting the color fastness as well as the adhesion on the textile substrate.

The glued lamellar structure is in a way a sandwich structure in which the white background layer is glued to the textile substrate, whereby no mixing of the background layer with the adhesive layer, e.g. a hot-melt layer, by a melting process is possible and the entire system is nevertheless flexible enough that the graphic presentation printed on the ink-receiving layer cannot be detached by mechanical stresses.

The adhesive layer has to be essentially or completely fusible and must only be adhesive in a fused condition. In a very particularly preferred embodiment, the adhesive layer which is found directly on the carrier material is a pure hot-melt layer. The hot-melt layer is essentially a wax-like polymer which is easily fusible and thus can for example be transferred onto the textile substrate together with the imprinted ink-receiving layer by ironing on. Due to its wax-like properties, the hot-melt layer primarily effects the adhesion to the textile substrate. On the other hand, the hot-melt layer also has to mediate a good adhesion to the white background layer which is chemically totally different (not wax-like, nonfusible). This is inventively achieved in that in the hot-melt layer, very small spherical polyester particles of a granular size of less than 30 µm are dispersed. These spherical polyester particles in turn are chemically more related to the white background layer (than the pure hot-melt wax components) so that during melting they can form or enhance, respectively, the adhesion to the white background layer. A particle size of less than 30 µm is required so that the particles do not bulge out from the layer and thus cause problems during coating. The spherical polyester particles are preferably obtained for example by stirring in cryo-ground polyester together with the wax-like hot-melt compounds during the production of a dispersion and melting small drops of up to 30 µm (emulsion). After the cooling, the drops solidify and

small beads develop, i.e., a dispersion. A preferred hot-melt compound is for example an ethylene acrylic acid co-polymer or a PU dispersion. Together with the spherical polyester particles of a granular size of less than 30 µm, said compound is processed to a hot-melt layer dispersion.

As adhesive layer, besides a pure hot-melt, also a hot-melt adhesive dissolved in a solvent can be used. For example a solvent-containing adhesive based on polyamides or polyethylenes which on the one hand effects a good adhesion to the textile substrate and on the other hand to the white background layer are suitable for the realization of the present invention.

In a preferred embodiment, the adhesive layer, however, contains or is composed of a pure hot-melt since said hot-melt forms the desired adhesion to the white background layer and to the textile substrate by means of a comparatively simple external controlling means, i.e. by means of ironing on, in a convenient but efficient manner.

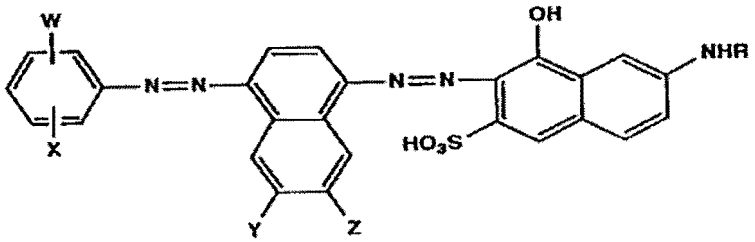
The ink-receiving layer (ink layer) is situated on the white background layer and primarily comprises a highly porous pigment and a binder. The highly porous pigment provides on the one hand a purely mechanical uptake of the ink during printing of the desired graphic presentation whereby a maximal porosity ensures an especially high absorbability. Binders are necessary to bind the highly porous pigments on the product surface to allow the processing (imprinting) of the ink-jet transfer system.

In principle, all known, mainly highly porous pigments are suitable as ink-receiving layer for the purposes of the present invention: Examples are polyesters, PE-wax, PE-powders, ethylene-VAC copolymers, nylon, epoxy compounds. Suitable as binders are polyacrylates, styrene-butadiene copolymers, ethylene-VAC copolymers, nylon, nitrile rubber, PVC, PVAC, ethylene-acrylate-copolymers.

Preferably the at least one ink-receiving layer comprises a mixture of a highly porous pigment and a binder whereby more preferably the molecules of the highly porous pigment and optionally of the binder and optionally of the adhesive layer, e.g. the hot-melt layer, are capable of forming essentially covalent bonds to the dyestuff molecules of the ink. This has the advantage that the respective dyestuffs, after printing on the textile substrate, for instance by ironing on, are no longer primarily mechanically bonded, but as a result of - essentially covalent - bonds are chemically bonded to the molecules of the pigment and of the binder and optionally of the hot-melt. This is achieved in that the molecules of the pigment and optionally of the binder and optionally of the hot-melt have available reactive groups that are capable of forming covalent bonds to the also reactive groups of the dyestuff molecules of the ink.

The essentially covalent bonds between the dyestuff molecules of the ink and the molecules of the pigment as well as of the binder are, among others, formed upon providing energy, for instance by ironing on (at about 190°C) the inventive ink-jet transfer system on the textile substrate.

For the printing of the ink-jet transfer system, for instance by means of an ink-jet printer, in the market, usually acid dyestuffs are used in printer inks, for example azo-dyestuffs according to formula I.



W = COOH

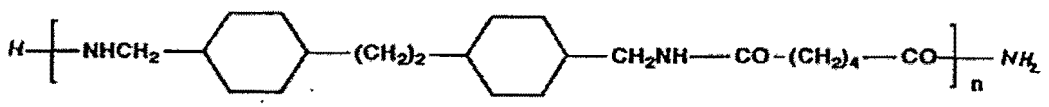
X = H or COOH

Y & Z = H, COOH or $SO_3H$

R = H, $CH_2COOH$ or $CH_2CH_2COOH$ (I)

The molecules of the ink dyestuffs are primarily present as anions in solution and also have available reactive groups which allow the formation of chemical bonds to the reactive groups of the pigment molecules as well as optionally the binder molecules. The reactive groups are usually one or more sulfonate groups or carboxylate groups per dyestuff molecule. Under suitable conditions, for instance through heating during the ironing on of the ink-jet transfer system onto the textile substrate, covalent or also rather ionic bonds or intermediary valence bonds, respectively, can be formed between said sulfonate groups or carboxylate groups, respectively, and the reactive groups, for example amino groups, of the pigment or binder, respectively. But in particular, the covalent bonds of the dyestuff molecules to the molecules of the ink-receiving layer, with formation of e.g. sulfonamides ($-SO_2NH-R$) or amide groups ($-CONH-R$), respectively, (besides rather amphoteric $SO_3^-$ $NH_3^+-R$ groups) are particularly preferred.

As an example, the poly[1,2-bis(aminomethylcyclohexyl)ethane-adipic acid amide] of the formula (II) is mentioned which generates essentially covalent bonds (sulfonamide groups or acid amide groups, respectively) with its terminal amino groups upon reacting with the acid groups of an azo-dyestuff.




(II)

## Modes for carrying out the invention

In a preferred embodiment, the ink-receiving layer of the inventive ink-jet transfer system is composed of a highly porous pigment and a binder, whereby at least one of the two components, in particular the pigment being present in bigger amounts has available reactive amino groups that are capable of forming essentially covalent bonds to the dyestuff molecules of the liquid ink.

In a particularly preferred embodiment of the present invention, the ink-receiving layer comprises a highly porous polyamide pigment and a binder composed of a soluble polyamide, whereby the terminal, free amino groups of the polyamide pigment and of the polyamide binder are capable of fixing reactive groups, for example sulfonate groups or carboxylate groups of the dyestuff molecules. Because of that, with the pigment component as well as the binder component, a chemical fixation of the dyestuff molecules can be achieved.

Besides the inventive requirement of the capability of the formation of essentially covalent bonds between the dyestuff molecules of the ink and the molecules of the pigment as well as the binder, the ink-jet transfer system according to the present invention has to have a high absorption capacity or uptake, respectively, of ink in order to guarantee a clear print image. This requirement is achieved by providing a pigment, preferably a polyamide pigment with a high porosity.

Preferred polyamide pigments which are used for the ink-jet transfer systems according to the present invention preferably display a spherical, for instance a globular geometry and an interior surface which is as high as possible. The granular sizes of the used polyamide pigments are in a range of about 2 µm and about 45 µm, whereby a

range of 2 to 10 μm is particularly preferred. The bigger the granular size of the polyamide pigments, the more the surface of said pigments is closed and thus the ink-receiving capacity is reduced or even rendered impossible, respectively. The interior surface of the highly porous pigment amounts to at least about 15 $m^2/g$; preferably it is between about 20-30 $m^2/g$.

It turned out that in particular a polyamide pigment with the trade name "Orgasol" displays the required properties, in particular the high-grade porosity.

A highly porous polyamide pigment with an interior surface of at least about 15 $m^2/g$ and a granular size of about 2 μm and about 45 μm is obtained by means of an anionic polyaddition and a subsequent controlled precipitation process. In contrast to the conventional production methods in which a polyamide condensation product, for example as a granulate, is prepared, which is then milled, the polyamide pigments are actually grown and the growth of the pigments is ceased upon reaching the desired granular size. 85-95 % of the polyamide pigments thus obtained show the desired form and granular size, whereby only maximally 15 % have a smaller or bigger granular size.

For an ink-receiving layer with highly porous polyamides being used as pigments, the binder preferably is composed of a polyamide as well. The polyamide used as a binder is different concerning its properties from the polyamide pigment insofar as it is employed as a solution and thus does not have to comply with specific form requirements. The use of polyamide as a binder is therefore less critical. It has only to be soluble in a suitable solvent, for instance alcohol or a alcohol-water mixture, respectively, and preferably has available free terminal amino groups by means of which dyestuff molecules, for example sulfonate groups of azo-dyestuffs or ester groups can be fixed.

The ratio of the highly porous pigment and the binder in the ink-receiving layer of the inventive ink-jet transfer system amounts to between about 5:1 and 1:1, preferably 3:1 and 2:1 and very much preferred 2.4:1.

The hot-melt layer which is preferably used in the ink-jet transfer system according to the present invention as adhesive layer is found directly on the removable carrier material and serves to transfer the graphic presentation imprinted by the ink-jet printer on the textile substrate and to ensure an adhesion to the white background layer. Said transfer is, for instance, effected by a cold copy, i.e. by ironing on, cooling down and removing the carrier layer (baking paper). During the ironing on, the hot-melt layer and the ink-jet receiving layer, but not the white background layer are molten. This way, the image imprinted on the ink-receiving layer is transferred on the textile substrate without any fusing-associated distortions.

The hot-melt preferably used as adhesive layer in contrast to the highly porous pigment, binder as well as the background layer, is essentially wax-like, i.e. it can be fused. Usually, hot-melts melt in a range of about 100-120°C while the highly porous pigments preferably melt in a range of 120-180°C, preferably 140-160°C. A usual hot-melt is for instance an ethylene acrylic acid copolymer dispersion.

Further additives can be contained in the ink-jet transfer system according to the present invention, however, upon the use of such additives, it has to be paid attention that their use does not impair the washproofness of the eventually obtained transfer print. Because of process-technology reasons, for instance, it is reasonable to use a dispersing additive for organic pigments in the preparation of the inventive ink-jet transfer system.

As a support (cover layer) for the cold copy, nearly any separating paper can be used, preferably a heat-resisting paper, for example a silicone paper is used.

Besides the ink-jet transfer system itself, an additional aspect of the present invention is a method for its preparation. The coating method comprises the following steps:

a) application of an adhesive layer, preferably a hot-melt layer, which has dispersed spherical polyester particles of a granular size of less than 30 µm onto a carrier material, for instance silicone paper, by means of a coating means for instance a coating machine, whereby a layer thickness of about 30 to 40 µm is adjusted, thereafter drying the hot-melt layer, and

b) application of a white background layer composed of elastic plastics which are non-fusible at ironing on temperatures (i.e. up to about 220°C), and which are filled with white, preferably inorganic, pigments onto the hot-melt layer, preferably with a resulting layer thickness of about 20-35 µm,

c) application of at least one ink-receiving layer dispersion onto the white background layer, and

d) drying the ink-jet transfer system.

The double/multiple application of the ink-receiving layer according to step c) provides the advantage that a smooth and even surface as well as an ink-receiving layer with a balanced thickness is formed, whereby the printing process or the resulting print image, respectively, is influenced in a positive way.

First, the graphic presentation to be applied onto the textile substrate is laterally correctly printed onto the ink-jet transfer system thus obtained by a usual printer, e.g. an ink-jet printer (ink-jet-plotter), cut out, removed from the support (e.g. silicone paper), cov-

ered with baking paper and afterwards ironed onto the desired textile substrate, for instance a T-shirt, at a temperature of between about 160 and 220°C, preferably of 170°C, during at least 10 seconds. The lowest layer is the carrier material which is removed and discarded before the application of the graphic presentation. As the preferred cover paper, a heat-resistant silicone paper (baking paper) is used. The printed graphic presentation obtained in such a way (cold copy) is smooth and faint.

In the following, the present invention shall be illustrated by two examples whereby the examples are not to be construed as limiting the scope of protection.

Example 1

Preparation of an ink-jet transfer system

In a first step, the hot-melt layer is applied onto a carrier material: Thereby, a silicone paper of a layer thickness of about 0.1 mm is coated with an ethylene acrylic acid copolymer containing dispersed spherical polyester particles of a granular size of between 5-25 µm. The ratio of ethylene acrylic acid copolymer and spherical polyester particles is about 60:40 and the resulting layer thickness of the hot-melt layer is about 30 µm.

Subsequently, a white background layer (polyurethane foil) with a thickness of about 40 µm containing about 15 weight-% $TiO_2$ is applied onto the silicone paper coated with the hot-melt.

On said elastic background layer of polyurethane/$TiO_2$, a dispersion containing the ink-receiving layer is applied in two steps. In the first step, a layer thickness of 15 µm is applied and in the second step, a layer thickness of 15 µm is applied, whereby a total layer thickness of the ink-receiving layer of 30 µm results.

The ink-receiving layer was previously prepared as follows: an ethanol/water mixture in the ratio of 3:1 is placed in a vessel and a soluble polyamide binder is dissolved therein under heating to 45°C. Afterwards the highly porous polyamide pigment "Orgasol 3501 EX D NAT1" with a granular size of 10 µm as well as an interior surface of about 25 $m^2/g$ pigment is dispersed in the solution.

In order to stabilize the dispersion, a dispersing additive for organic pigments commercialized by the Company Coatex with the product designation COADIS 123K is introduced and the dispersion is stirred during 10 minutes at room temperature.

On the coating machine, the solvent is allowed to evaporate in order to obtain a solid ink-receiving layer on which the desired graphic presentation can be printed by means of an ink-jet printer.

The desired foils can be cut arbitrarily according to the required needs.

Example 2

Use of an ink-jet transfer system for printing

The ink-jet transfer system prepared in example 1 is used in order to print a graphic presentation on a T-shirt. Thereby, in a first step, the desired electronically processible and stored graphic presentation is printed by a computer by means of an ink-jet printer in a laterally correct way onto the sheet which has been obtained as the ink-jet transfer system in example 1.

Afterwards, the print is removed and put with the white side onto the desired side of the selected T-shirt and ironed on by means of a hot iron (baking paper + temperature of about 190°C) during 10 seconds. Afterwards, the T-shirt thus processed is cooled down to about room

temperature and the baking paper, i.e. the silicone paper is removed. The image thus obtained is shining and matt.

While in the present invention, preferred embodiments of the invention are described, it has clearly to be pointed out that the invention is not limited thereto and may be otherwise practiced in the scope of the following claims.

Claims

1. An ink-jet transfer system, characterized in that it comprises or is composed of

a) a carrier material,

b) an adhesive layer being applied onto said carrier material which has dispersed spherical polyester particles of a granular size of less than 30 µm,

c) a white background layer composed of elastic plastics which are non-fusible at temperatures up to 220°C and which are filled with white inorganic pigments being applied onto the hot-melt layer and,

d) at least one ink-receiving layer.

2. The ink-jet transfer system according to claim 1, characterized in that the molecules of the ink-receiving layer and/or of the binder contained therein are capable of forming chemical, particularly covalent bonds to the dyestuff molecules of the ink.

3. The ink-jet transfer system according to claim 1 or 2, characterized in that the ink-receiving layer has available reactive groups which are capable of forming essentially covalent bonds to the dyestuff molecules, particularly to azo-dyestuff molecules or acid-dyestuff molecules of the ink.

4. The ink-jet transfer system according to claim 3, characterized in that the reactive groups are amino groups.

5. The ink-jet transfer system according to one of the claims 1 to 4, characterized in that the ink-receiving layer contains or is composed of a highly porous polyamide pigment with a surface of at least about 15 $m^2/g$, preferably of about 20-30 $m^2/g$ and a mean granular size of approximately about 2 to 25 µm, preferably about 2-10 µm, as well as a soluble polyamide as binder and that the hot-melt contains or is composed of a polyester.

6. The ink-jet transfer system according to claim 5, characterized in that the highly porous polyamide pigment is obtained by means of an anionic poly-addition and subsequent controlled precipitation whereby the granular sizes are adjusted by ceasing the precipitation.

7. The ink-jet transfer system according to one of the claims 1 to 6, characterized in that the ratio between the porous pigment and the binder is between about 5:1 and 1:1, preferably 3:1 and 2:1 and particularly preferred 2.4:1.

8. The ink-jet transfer system according to one of the claims 1 to 7, characterized in that the elastic plastics of the white background layer are selected from the group comprising polyurethanes, polyacrylates, polyalkylenes, particularly preferred polyurethanes.

9. The ink-jet transfer system according to one of the claims 1 to 8, characterized in that the pigments in the white background layer are selected from the group comprising $BaSO_4$, ZnS, $TiO_2$, ZnO, SbO.

10. The ink-jet transfer system according to one of the claims 1 to 9, characterized in that the adhesive layer is a hot-melt layer.

11. The ink-jet transfer system according to claim 10, characterized in that the hot-melt layer contains or is composed of a mixture a blend of an ethylene acrylic acid copolymer and polyester particles of a granular size of less than or equal to 20 µm.

12. The ink-jet transfer system according to one of the claims 1 to 11, characterized in that the carrier layer is composed of a heat-resistant separating paper, preferably silicone paper.

13. The ink-jet transfer system according to one of the claims 1 to 12, characterized in that it furthermore contains a dispersing additive for organic pigments.

14. Method for the preparation of an ink-jet transfer system according to one of the claims 1 to 13, comprising the following steps:

a) application of an adhesive layer having dispersed spherical polyester particles of a granular size of less than 30 µm onto a carrier material whereby a layer thickness of about 30 to 40 µm is adjusted,

b) application of a white background layer composed of elastic plastics non-fusible at temperatures up to 220°C and filled with white inorganic pigments onto the hot-melt layer,

c) application of at least one ink-receiving layer onto said white background layer so that a total thickness of the ink-receiving layer of about 20 to 35 µm is achieved and,

d) letting the solvent evaporate during coating.

15. Method according to claim 14, characterized in that two ink-receiving layers are applied.

16. Method for printing textile substrates, characterized in that a graphic presentation is printed laterally correct by a computer via a printer on the ink-jet transfer system according to one of the claims 1 to 13 and thereafter is hot iron pressed onto the textile substrate and in that the carrier material is removed cold after cooling down.

Abstract

An ink-jet transfer system is disclosed, as well as a transfer printed product which is highly wash-resistant, colour-fast and environment-friendly, and a process for producing the same and its use in a printing process by means of the disclosed ink-jet transfer system. The disclosed ink-jet transfer system has a substrate, a hot-melt layer applied on the substrate and at least one ink-absorbing layer which comprises a mixture of a highly porous pigment and a binder. The molecules of the pigment and if required of the binder and hot-melt layer can form chemical bonds with the dyeing molecules of the ink.